Election/Restriction

Applicant acknowledges the final of the requirement of with respect to the applicant's traverse of the dummy wafer seasoning process in Paper No. 13. Applicants note that claims 2 to 5, 8 to 10, 13 to 15 and 17 to 34 are pending.

In the Claims

Claims 35 to 37 are new and have been added to better encompass the full scope and breadth of the invention notwithstanding the patentability of the original claims. Claims 35 to 37 correspond to amended claims 21, 27 and 33 but wherein the seasoning method is a waferless seasoning method employing a bromine and/or chlorine containing etchant gas.

Claim Rejections

The Rejection Of Claims 20, 26 And 32 Under 35 U.S.C. §103(a) as Being Unpatentable Over Soga (U.S. Patent No. 6,090,718)

The rejection of claims 20, 26 and 32 under 35 U.S.C. §103(a) as being unpatentable over Soga (U.S. Patent No. 6,090,718) (the '718 Soga Patent) is acknowledged.

The Rejection Of Claims 2 To 5, 8 To 10, 13 To 15, 17, 18, 20 To 24, 26 To 30 And 32 To 34 Under 35 U.S.C. §103(a) as Being Unpatentable Over Soga (U.S. Patent No. 6,090,718) As Applied In Paragraph 19 Above, And Further In View Of Either Canale et el. (U.S. Patent No. 6,440,858) Or Su et al. (Article Entitled "Deep Trench Process Performance Enhancements In An MERIE Reactor")

The rejection of claims 2 to 5, 8 to 10, 13 to 15, 17, 18, 20 to 24 and 30 to 32 under 35 U.S.C. §103(a) as being unpatentable over Soga (U.S. Patent No. 6,090,718) (The '718 Soga Patent) as applied in paragraph 19 above, and further in view of either Canale et al. (U.S. Patent No. 6,440,858) (the '858 Canale Patent) or Su et al. (Article Entitled "Deep Trench Process Performance Enhancements In An MERIE Reactor") (the Su Article) is acknowledged.

Applicants' wish to briefly point up the claimed features of their invention which are believed to be not shown nor obvious from the teachings of known references in this field. The independent claims all clearly define, inter alia, etching a first polycrystalline silicon layer employing a plasma etchant gas composition that upon plasma activation provides an active bromine containing etchant species and/or an active chlorine containing etchant species.

The Examiner states that Soga fails to disclose, inter alia, "the specific dry etching of a polysi layer or a CZ-Si layer on a wafer in a plasma comprised of compounds capable of generating free Br or Cl..." Page 3 of the instant Office Action. None of the other cited references cure this deficiency.

Applicants urge that inducing an active bromine containing etchant species and/or an active chlorine containing etchant species during the etching 18 of the polycrystalline silicon layer is a substantial feature of the instant claimed invention as described at page 16, lines 9 to18 of the specification as filed and it would not be obvious to modify Soga to meet the limitations of the independent claims. The teachings of Soga do not make obvious such a modification to meet the claimed limitations of the pending independent claims.

Thus independent claims 20, 21, 26, 27, 32, 33 and 35 to 37 distinguish over the '718 Soga Patent and/or the '718 Soga Patent and further in view of either the '858 Canale Patent or the Su Article under §103(a) for the reasoning above, and further, inter alia: the prior art lack a suggestion that Soga should be modified in a manner required to meet the claims; up to now those skilled in the art never appreciated the advantage of the invention, although it is inherent; and the Examiner has not presented a convincing line of reasoning as to why the claimed subject matter as a whole, including its differences over the prior art, would have been obvious.

Further, Applicants urge that, inter alia, the Examiner's taking office notice three times in the 103(a) rejection of independent claims 20, 26 and 32 to build his obviousness rejection of these claims belies the very obviousness the Examiner is asserting.

Claims 2 to 5, 17 to 19 depend from independent claim 21; claims 8 to 10, 23 to 25 and 28 depend from independent 27; and claims 13 to 15, 29 to 31 and 24 depend from independent claim 21; and are believed to distinguish over the combination for the reasons previously cited.

Allowable subject matter

Applicants note that claims 19, 25 and 31 have not been rejected and are therefore presumed to be allowable if rewritten in independent form to include all the limitations of the respective base claims and any respective intervening claims. Applicant requests that the rewriting of thus allowable claims 19, 25 and 31 be held in abeyance pending the final determination of the allowability of the respective parent claims 21, 27 and 33.

Therefore claims 2 to 5, 8 to 10, 13 to 15, and 17 to 37 are allowable and allowance is respectfully solicited.

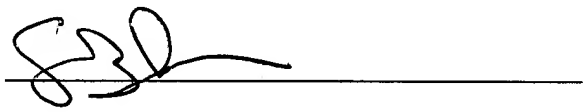
CONCLUSION

In conclusion, reconsideration and withdrawal of the rejections are respectively requested. Allowance of all claims is requested. Issuance of the application is requested.

Attached hereto is a marked-up version of the changes made to the specification and claims by the current amendment. The attached page is captioned **"Version with markings to show changes made."**

It is requested that the Examiner telephone Stephen G. Stanton, Esq. (#35,690) at (610) 296 – 5194 or the undersigned attorney/George Saile, Esq. (#19,572) at (845) 452 – 5863 if the Examiner has any questions or issues that may be resolved to expedite prosecution and place this Application in condition for Allowance.

Respectively submitted,



Stephen B. Ackerman

Reg. No. 37,761

Version with markings to show changes made.

Please add the following new claims.

-- 35. A method for forming an etched silicon layer comprising:

providing a first substrate having formed thereover a first silicon layer;

etching the first silicon layer to form an etched first silicon layer while employing a plasma etch method employing a plasma reactor chamber in conjunction with a plasma etchant gas composition which upon plasma activation provides at least one of an active bromine containing etchant species and an active chlorine containing etchant species, wherein within the plasma etch method:

(1) a cleaned plasma reactor chamber is seasoned to provide a seasoned plasma reactor chamber having a seasoning polymer layer formed therein; wherein the seasoning method is a waferless seasoning method employing a bromine and/or chlorine containing etchant gas;

(2) the first silicon layer is etched to form the etched first silicon layer within the seasoned plasma reactor chamber; wherein the first silicon layer etch step, when using an eight inch diameter substrate, employs:

a reactor chamber pressure of from about 1 to 500 mTorr;

a radio frequency source power of from about 10 to 2000 watts at a source radio frequency of from about 2 to 13.56 MHz and an external bias power of up to about 500 watts;

a substrate temperature and a seasoned plasma reactor chamber temperature of from about 20 to 200°C;

a hydrogen bromide flow rate of from about 10 to 200 sccm;

an oxygen flow rate of from about 1 to 50 sccm;

a nitrogen trifluoride flow rate of from about 1 to 50 sccm;

a backside cooling gas pressure of from about 1 to 50 torr and a flow rate of from about 2 to 50 sccm; and

a magnetic field of up to about 200 gauss; and

(3) the seasoning polymer layer is cleaned from the seasoned plasma reactor chamber to provide the cleaned plasma reactor chamber after etching the first silicon layer to form the etched first silicon layer within the seasoned plasma reactor chamber prior to etching a second substrate having formed thereover a second silicon layer to form an etched second silicon layer formed over the second substrate within the plasma reactor chamber while employing the plasma etch method in accord with (1), (2) and (3).

36. A method for forming an etched monocrystalline silicon layer comprising:

providing a first substrate having formed thereover a first monocrystalline silicon layer;

etching the first monocrystalline silicon layer to form an etched first monocrystalline silicon layer while employing a plasma etch method employing a plasma reactor chamber in conjunction with a plasma etchant gas composition which upon plasma activation provides at least one of an active bromine containing etchant species and an active chlorine containing etchant species, wherein within the plasma etch method:

(1) a cleaned plasma reactor chamber is seasoned to provide a seasoned plasma reactor chamber having a seasoning polymer layer formed therein; wherein the seasoning method is a waferless seasoning method employing a bromine and/or chlorine containing etchant gas;

(2) the first monocrystalline silicon layer is etched to form the etched first monocrystalline silicon layer within the seasoned plasma reactor chamber; wherein the first monocrystalline silicon layer etch step, when using an eight inch diameter substrate, employs:

a reactor chamber pressure of from about 1 to 500 mTorr;

a radio frequency source power of from about 10 to 2000 watts at a source radio frequency of from about 2 to 13.56 MHz and an external bias power of up to about 500 watts;

a substrate temperature and a seasoned plasma reactor chamber temperature of from about 20 to 200°C;

a hydrogen bromide flow rate of from about 10 to 200 sccm;

an oxygen flow rate of from about 1 to 50 sccm;

a nitrogen trifluoride flow rate of from about 1 to 50 sccm;

a backside cooling gas pressure of from about 1 to 50 torr and a flow rate of from about 2 to 50 sccm; and

a magnetic field of up to about 200 gauss; and

(3) the seasoning polymer layer is cleaned from the seasoned plasma reactor chamber to provide the cleaned plasma reactor chamber after etching the first monocrystalline silicon layer to form the etched first monocrystalline silicon layer within the seasoned plasma reactor chamber prior to etching a second substrate

having formed thereover a second monocrystalline silicon layer to form an etched second monocrystalline silicon layer formed over the second substrate within the plasma reactor chamber while employing the plasma etch method in accord with (1), (2) and (3).

37. A method for forming an etched polycrystalline silicon layer comprising:

providing a first substrate having formed thereover a first polycrystalline silicon layer;

etching the first polycrystalline silicon layer to form an etched first polycrystalline silicon layer while employing a plasma etch method employing a plasma reactor chamber in conjunction with a plasma etchant gas composition which upon plasma activation provides an active bromine containing etchant species, wherein within the plasma etch method:

(1) a cleaned plasma reactor chamber is seasoned to provide a seasoned plasma reactor chamber having a seasoning polymer layer formed therein; wherein the seasoning method is a waferless seasoning method employing a bromine and/or chlorine containing etchant gas;

(2) the first polycrystalline silicon layer is etched to form the etched first polycrystalline silicon layer within the seasoned plasma reactor chamber; wherein the first polycrystalline silicon layer etch step, when using an eight inch diameter substrate, employs:

a reactor chamber pressure of from about 1 to 500 mTorr;

a radio frequency source power of from about 10 to 2000 watts at a source radio frequency of from about 2 to 13.56 MHz and an external bias power of up to about 500 watts;

a substrate temperature and a seasoned plasma reactor chamber temperature of from about 20 to 200°C;

a hydrogen bromide flow rate of from about 10 to 200 sccm;

an oxygen flow rate of from about 1 to 50 sccm;

a nitrogen trifluoride flow rate of from about 1 to 50 sccm;

a backside cooling gas pressure of from about 1 to 50 torr and a flow rate of from about 2 to 50 sccm; and

a magnetic field of up to about 200 gauss; and

(3) the seasoning polymer layer is cleaned from the seasoned plasma reactor chamber to provide the cleaned plasma reactor chamber after etching the first polycrystalline silicon layer to form the etched first polycrystalline silicon layer within the seasoned plasma reactor chamber prior to etching a second substrate having formed thereover a second polycrystalline silicon layer to form an etched second polycrystalline silicon layer formed over the second substrate within the plasma reactor chamber while employing the plasma etch method in accord with (1), (2) and (3). --